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ABSTRACT

Considered in the paper, which originally was prepared for publication by the Moscow Institute of Defectology, are research and methodology related to education of deaf children in the United States. Described are deaf children's communicative problems, and defined are classifications according to varying degrees of deafness. Discussed is incidence of deaf children in preschool, elementary, secondary, and post-secondary programs; and noted are changes in characteristics of children served by classes for the deaf. Examined are results of research on language and deafness, expressive language, and receptive language. Discussed is the oral-manual methods controversy in the light of methods used in countries such as Great Britain, the Soviet Union, and the U.S. (which uses four methods: oral, auditory, Rochester and simultaneous). Research which shows better development of deaf children with deaf parents is reviewed. Considered are two philosophical approaches to preschool programs, and the lack of research on effectiveness of intervention programs for young hearing impaired children. The author attributes recent advances for the aurally handicapped to the medical and technological sectors, and encourages educators in their development of theoretical disciplines, such as psycholinguistics and cognition, and applied disciplines that related to reading and learning disabilities. Included in appendixes are listings of periodicals concerned with deafness and of major organizations in the U.S. which serve the deaf. (MC)

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EDUCATION OF THE DEAF IN THE UNITED STATES*

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Research, Development and Demonstration
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Minneapolis, Minnesota

November 1970

Department of Health, Education, and Welfare
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TECHNICAL REPORTS

University of Minnesota Research, Development and Demonstration
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(Place of publication shown in parentheses where applicable)

1. R. Riegel & A. Taylor. Strategies in the classroom: A summer remedial program for young handicapped children. Occasional Paper #14. March 1973.

2. D. Moores. Early childhood special education for the hearing handicapped. Occasional Paper #13. February 1973.

3. R. Riegel & A. Taylor. A comparison of conceptual strategies for grouping and remembering employed by educable mentally retarded and non-retarded children. Research Report #46. February 1973.

4. J. Rynders. Two basic considerations in utilizing mothers as tutors of their very young retarded or potentially retarded children. Occasional Paper #12. January 1973.

5. R. Bruininks, J. Rynders, & J. Gross. Social acceptance of mildly retarded pupils in resource rooms and regular classes. Research Report #45. January 1973.

6. J. Turnure & M. Thurlow. The effects of interrogative elaborations in the learning of normal and EMR children. Research Report #44. January 1973.

7. J. Turnure & S. Samuels. Attention and reading achievement in first grade boys and girls. Research Report #43. November 1972.

8. R. Riegel, A. Taylor, S. Clarren, & F. Danner. Training educationally handicapped children to use associative grouping strategies for the organization and recall of categorizable material. Research Report #42 November 1972.

9. R. Riegel, F. Danner, & A. Taylor. Steps in sequence: Training educationally handicapped children to use strategies for learning. Development Report #2. November 1972.

10. A. Taylor, M. Thurlow, & J. Turnure. The teacher's introduction to: the Math Vocabulary Program. Development Report #1. March 1973.

11. J. Turnure & M. Thurlow. The effects of structural variations in elaboration on learning . . normal and EMR children. Research Report #41. September 1972.

12. A. Taylor & N. Bender. Variations of strategy training and the recognition memory of EMR children. Research Report #40. September 1972. (American Educational Research Journal, in press).

13. D. Moores, C. McIntyre, & K. Weiss. Evaluation of programs for hearing impaired children: Report of 1971-1972. Research Report #39. September 1972.

14. R. Rubin. Follow-up of applicants for admission to graduate programs in special education. Occasional Paper #11. July 1972.

15. D. Moores. Communication - Some unanswered questions and some unquestioned answers. Occasional Paper #10. July 1972.

16. A. Taylor & S. Whitely. Overt verbalization and the continued production of effective elaborations by EMR children. Research Report #38. June 1972. (American Journal of Mental Deficiency, in press).

17. R. Riegel. Measuring educationally handicapped children's organizational strategies by sampling overt groupings. Research Report #37. May 1972.

18. E. Gallistel, M. Boyle, L. Curran, & M. Hawthorne. The relation of visual and auditory aptitudes to first grade low readers' achievement under sight-word and systematic phonic instruction. Research Report #36. May 1972.

19. E. Gallistel & P. Fischer. Decoding skills acquired by low readers taught in regular classrooms using clinical techniques. Research Report #35. May 1972.

20. J. Turnure & M. Thurlow. Verbal elaboration in children: Variations in procedures and design. Research Report #34. March 1972.

21. D. Krus & W. Bart. An ordering-theoretic method of multidimensional scaling of items. Research Report #33. March 1972.

22. J. Turnure & S. Larsen. Effects of various instruction and reinforcement conditions on the learning of a three-position oddity problem by nursery school children. Research Report #32. March 1972.

23. J. Turnure & S. Larsen. Outerdirectedness in mentally retarded children as a function of sex of experimenter and sex of subject. Research Report #31. March 1972.

24. J. Rynders & J. Horrobin. A mobile unit for delivering educational services to Down's Syndrome (Mongoloid) infants. Research Report #30. January 1972. (Presented at Council for Exceptional Children, Special National Conference, Memphis, December, 1971).

25. F. Danner & A. Taylor. Pictures and relational imagery training in children's learning. Research Report #29. December 1971. (Journal of Experimental Child Psychology, in press).

26. J. Turnure & M. Thurlow. Verbal elaboration phenomena in nursery school children. Research Report #28. December 1971.

27. D. Moores & C. McIntyre. Evaluation of programs for hearing impaired children: Progress report 1970-1971. Research Report #27. December 1971.

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EDUCATION OF THE DEAF IN THE UNITED STATES*

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Department of Health, Education, and Welfare

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RESEARCH AND DEVELOPMENT CENTER
IN EDUCATION OF HANDICAPPED CHILDREN
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The University of Minnesota Research, Development and Demonstration Center in Education of Handicapped Children has been established to concentrate on intervention strategies and materials which develop and improve language and communication skills in young handicapped children.

The long term objective of the Center is to improve the language and communication abilities of handicapped children by means of identification of linguistically and potentially linguistically handicapped children, development and evaluation of intervention strategies with young handicapped children and dissemination of findings and products of benefit to young handicapped children.

EDUCATION OF THE DEAF IN THE UNITED STATES*

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INTRODUCTION

In the United States, as well as Europe, perhaps no area of education research has generated more heat and less light than the problem of educating severely hearing-impaired children. Almost from the time of the establishment of the American School for the Deaf in Hartford, Connecticut in 1817, the field has been riven by debilitating controversies which have drained the energies of deaf children and of gifted educators, individuals who consequently have approached problems within the framework of overl simplistic either/or, black-white polarizations. It has been noted (Babbidge, et al., 1965) that, in the opinion of many, emotion has been accepted as a substitute for research for over 100 years in education of the deaf. The incontrovertible evidence, an endless stream of children pouring out of programs for the deaf unable to read at the fifth grade level, unable to write a simple sentence, unable to speechread anything but the most common expressions and unable to speak in a manner understandable to any but their immediate family, stands as mute testimony to an inability or unwillingness to come to grips with the generic problem of children with severe auditory deficits - - - language.

Part of the frustration may be accounted for by the extremely difficult nature of the task of academic achievement for children suffering early severe deafness. Other things being equal, the ease with which a child acquires language varies inversely with the severity of his hearing loss. Not to hear the human voice is not to hear

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*This paper was originally prepared for publication by the Moscow Institute of Defectology.

spoken language. While other children are able to utilize an intact auditory modality to build up automatic integrative mechanisms leading to early mastery of the sound, shape, and sense of their language, the deaf child is unique in that his language acquisition is primarily dependent on vision.

The child with normal hearing can be considered linguistically proficient in every sense of the word - he has a knowledge of the basic rules of his language. He can produce a potentially infinite number of novel yet appropriate utterances. Because of his unconscious mastery over the grammatical structure of his language, he can combine and recombine its elements indefinitely. He can produce and understand sentences to which he has never been exposed. He enters the formal situation in elementary school at age six with an already fully developed instrument for learning - - - language and communication ability - - - an ability which he has aquired with no conscious effort on the part of his parents or himself.

A profoundly deaf child, one with no functional response to speech, presents an entirely different picture. He does not, nor can he be expected to, acquire language naturally and automatically. Without intensive compensatory training he is totally nonverbal; he might even be unaware that such things as words exist. For this child language is not a facilitating device for the acquisition of knowledge. Rather it is an overwhelming obstacle that stands between the child and full development of his academic, intellectual and social potentials. The deaf child, although of potentially normal intelligence, finds his range of experience constrained by communication limitations. He suffers, relative to other children, from a lack of opportunity to

fully interact with and manipulate his environment in meaningful ways. Although deafness itself has no effect on intellectual development, if the child is not provided compensatory tools, the deafness will lead to impoverished communication skills which in themselves will set severe limitations on all aspects of development.

Much of the curriculum in a program for deaf children is designed to teach or develop the linguistic proficiency which hearing children bring to the educational process. The means by which most deaf children presently learn a language is a different, more laborious and inefficient procedure. The result is far below that of hearing children both qualitatively and quantitatively.

The hearing child employs his early knowledge of the phonological structure, or sound system, of his language as a vehicle to choose from a wealth of language forms pervading his environment leading to mastery of grammatical patterns. The profoundly deaf child must for the most part bypass the sound system in his quest for grammatical competence. Language perceived by the deaf child primarily through visual means, must be received through speechreading, signs, informal gestures, dactylic (fingerspelling) and/or graphemic presentation as well as through the auditory channel. Proficiency in speechreading (lipreading), which may be defined as interpreting the words or meaning conveyed by a speaker by watching lip and facial movements, is really a form of closure by which an individual decodes a message based on fragmentary bits of information transmitted through a distorted channel in which much of the information is lost. In the English language over one-half of what is said cannot be seen on the lips and even that which can be seen does not always clearly indicate a particular sound

or phomene. Speechreading is dependent on past experience with the redundancies and predictability of language based on previous linguistic experience and, therefore, is of limited utility by itself in the development of grammatical proficiency.

Definition of Terms

Although the present chapter is concerned primarily with children with severe to profound hearing losses, it should be emphasized that the term hearing impaired is not limited to an individual with a profound hearing loss. It covers the entire range of impairment and encompasses not only the deaf child but also the one with a mild loss who may have adequately developed grammatical structures and whose only difficulty may lie in imperfect discrimination and production of a small number of phonemes. The number of hearing impaired children decreases as a function of the extent of loss from mild to moderate to severe to profound levels.

Much of the confusion found among professionals dealing with children with hearing losses may be traced to an unfortunate inability to reach consensus on terminology. For some the term hearing impaired occurs in free variation with hard of hearing. For others it also includes deaf children. In addition, one person's conception of hard of hearing may overlap another's concept of deafness.

In the final analysis any definition must be a functional one and can be accepted only within broad limits. It would be no more defensible to classify a child as deaf or hard of hearing solely on the basis of an audiometric exam than it would be to judge a child as trainable or educable mentally retarded purely on the basis of performance on a standardized instrument for the assessment of

intellectual capacity. Other factors such as age of onset of the hearing loss, configuration of the loss, etiology, age of instigation of training, age of fitting and appropriateness of fit of the hearing aid, and family climate are all factors of prime inportance.

Within this framework, terms such as limited hearing, auditorially impaired, accoustically handicapped and hearing impaired include both of the more frequently used terms hard of hearing and deaf. The distinction between the two is usually drawn to differentiate between those for whom the auditory channel if affected but functional and those for whom the sense of hearing is non-functional for the development of language. The line between the deaf and hard of hearing for convenience has usually been drawn around a 75 decibel loss (I.S.O.) through the speech range. However, no satisfactory definition other than a behavioral one has been developed. The difficulties lie first in trying to categorize hearing loss into discrete levels when, in actuality, they exist on continua and, secondly, in attempting to generalize from an audiogram alone when so many other factors may also influence the behavior of an accoustically handicapped child.

A misleading and inaccurate practice which has added to the confusion is the tendency to report an individual's loss on the basis of an unaided audiogram. This practice has been criticized (Pollack, (1964) on the grounds that substantial differences may exist between aided and unaided hearing. With appropriate fitting, training and education some children may move across the line from deaf to hard of hearing. There is an increasing movement toward early diagnosis of hearing loss and fitting of hearing aids. In some preschool programs for the hearing impaired today, for example, every child is equipped with an individual hearing aid. It is much more reasonable, then, to refer to an individual's hearing loss under his normal

listening condition. For a majority of young hearing impaired children in the United States, the normal condition includes a hearing aid.

EDUCATIONAL PROGRAMS FOR THE DEAF IN THE UNITED STATES

In the United States approximately 50,000 children with severe hearing losses are receiving special educational services. The figure is consistent with estimates placing the incidence of deafness in the school age population from between 7 per 10,000 to 10 per 10,000 (Carhart, 1969). The numbers are affected by cyclical epidemics such as the Rubella epidemic which swept Western Europe and the United States from 1963 to 1965 and left in its wake two to four times the numbers of deaf children which would normally be expected.

Estimation of the number of school age hard of hearing children in the United States, those whose hearing is mildly or moderately affected, is almost impossible. No accurate data exist. In contrast to some European countries there are very few programs specifically designed for the hard of hearing child. A conservative estimate of 1% of the school age population would place the number at approximately 500,000 children. These children typically are educated in programs for the normally hearing. Services to these children may be provided by professional resource personnel but until recently most educational programs were unaware of the special problems of hard of hearing children. Research on this type of child is quite limited. Consistent with the trend toward individualization of instruction in educational programs is the development of programs in learning disabilities, reading, and speech pathology in school systems which should benefit large numbers of children achieving below their potential.

largely because of relatively moderate hearing losses.

Preschool Programs

The Directory of Services for the Deaf in the United States, (Doctor, 1970, p. 405) lists 507 preschool programs serving 9,959 children for the 1969-70 academic year. The majority of these children were in public school programs for the deaf with approximately 20% enrolled in residential schools. The total reflects the impact of the previously mentioned rubella epidemic and the numbers of deaf children in preschool programs is expected to decline in the near future.

Elementary and Secondary Programs

A total of 37,038 elementary and secondary aged (approximately 6 to 18) children were enrolled in programs for the deaf in 1969-70 (Doctor, 1970, p. 405). Of this number approximately 50% were enrolled in residential schools and 50% in day programs. About 20% of the children at residential schools were day students. The majority of residential schools are supported by the various states. Most day programs are run by local public school systems with state aid. Both types of programs are eligible for federal government funding.

Post-Secondary Programs

Gallaudet College in Washington, D. C., the only college for the deaf in the world, has been in existence since 1865 and offers a liberal arts education to its students. The college is supported by the federal government and its enrollment is approximately 1,000. In addition to the United States, deaf students from many parts of the world attend the college.

In 1968 the National Technical Institute for the Deaf was

established in affiliation with the Rochester (New York) Institute for Technology. Projections call for a total of 600 deaf students to be enrolled in advanced vocational programs at any one time. In addition to the National Technical Institute for the Deaf, three regional vocational-technical programs for the deaf have been estab-lsihed within the framework of already existing programs for students with normal hearing. They are based in St. Paul, Minnesota; New Orleans, Louisiana; and Seattle, Washington.

Changing Populations

The characteristics of children served by classes for the deaf appear to be changing. In the past, large numbers of children were adventitiously deaf. For example, one study of graduates of Gallaudet College who had gone on to receive post baccalaureate training in colleges and universities for the hearing reported that 64% of its sample became deaf after age three (Quigley, et al, 1969). Vernon (1969) has reported the effects of advances in medicine in the area of the hearing impaired. Twenty years ago a typical hearing impaired child with an etiology of meningitis would have lost his hearing around the age of four or later. For younger children the prognosis for successful recovery would have been greatly reduced. The addi-tional sequelae for a child affected after the age of four would be minimal, perhaps including no more than a somewhat impaired sense of balance. He would also have some base of linguistic competency on which to build.

Given improved medical treatment, a typical hearing impaired child in a program today would have lost his hearing preverbally, i.e. before the age of three. Older children, treated with anti-microbiotics, may presumably be expected to recover with no lasting

aftereffects. The young child, who might previously have died, is now being saved and finds himself in a program for the deaf. The educational prognosis for this child, in contrast to the post-verbal meningitic one, is quite limited because of his lack of a language base and because the sequalae for the preverbal child more frequently involve other severe handicaps in addition to deafness. Vernon argues that growing numbers of children in programs for the deaf reflect etiological factors related to multiply handicapping conditions. Children with etiologies of rubella and preverbal meningitis, for example, have tended to achieve at lower levels than other deaf children. An increasing number of programs is adapting to meet the needs of multipli-handicapped deaf children, and eight required centers for the deaf-blind have been funded by the United States Office of Education.

LANGUAGE AND DEAFNESS

The work of the linguist Noam Chomsky (1957, 1965) and his systematic presentation of a model of generative-transformational grammar has had a tremendous impact on linguists and psychologists in the United States. It has caused linguists to look at grammar from a different perspective and to approach it as a potentially infinite open-ended system. It has caused psychologists, particularly those of a behavioristic background, to reassess their positions in regard to species specificity, biological predisposition and the relationship of reinforcement to learning (Osgood, 1968). His seminal thought has been the basis for an explosion of original research into childhood language acquisition, among the most notable of which has been the work of Berko (1968), Brown and Bellugi (1964), Lenneberg (1967a), McNeill (1966a), Menyuk

(1968) and Slobin (1966). Two of these investigators (McNeill, 1966b, Lenneberg, 1967b) have addressed themselves specifically to deafness and language.

There is little evidence, however, that transformational grammar by itself will solve all the problems of deafness. This is as unrealistic as to expect the development of a hearing aid capable of presenting clear speech signals to all hearing impaired children. There is little doubt that children have innate propensities toward the learning of language and that the child is an active agent in the learning process, not some passive organism to be shaped completely by contingencies of reinforcement. However, it is of little benefit to people trying to educate deaf children to be told that the environment merely triggers the language acquisition process. The teacher of the deaf is painfully aware of the large numbers of non-verbal deaf children for whom the trigger has not been found. Faced with this situation everyday, educators of the deaf are constantly reminded of the importance of the environment and the need for a continued search of more and more effective ways of altering it to meet the needs of children.

Because of the difficulty inherent in comprehension of the speech of most deaf children, the majority of studies concerned with assessing their language proficiency have concentrated on written compositions in expressive language and a performance on standardized reading tests in the receptive sphere. Comparisons of the written language of deaf and hearing children clearly indicate that the deaf are significantly inferior in all aspects of language development and facility, illustrating the importance of an intact channel in language development and emphasizing the output limitations imposed by inefficient input.

Studies of Expressive Language

Heider and Heider (1940) compared the written language of children at three residential schools (ages 11 to 17) years of age to that of hearing students at two public schools (ages 8 to 14). A traditional grammatical analysis of 1,118 compositions describing a short motion picture shown to the subjects indicated that the deaf children exhibited simple, rigid, and immature patterns of written behavior. The investigators stated that the differences between the deaf and hearing were of such a nature as to prevent their description in completely quantitative terms.

Thompson (1936) analyzed 16,000 written compositions by 800 students attending 10 schools for the deaf in the United States and found an average of 104 mistakes per 1,000 words. Birch and Stuckless (1936) in an investigation of the written language of deaf children, employing basically the same techniques, reported a total of 5,044 grammatical errors from a corpus of 50,050 words, or slightly more than 100 errors per 1,000 words, a result in close agreement with the findings of Thompson.

Myklebust (1964) adapted the classifications used by Thompson to develop a Syntax score to measure written language based on categories including Word Order, Additions, Substitutions, Omissions, Punctuation, and Carrier Phrases. He compared deaf and hearing children from the ages of 7 to 17 and found significant differences at every level in favor of the hearing. He reported that the mean score of the 17 year old deaf children tested, 86.2, approximated the score of 86.8 achieved by the average seven year old hearing child. Myklebust noted that in the hearing children significant differences appeared between the 7- and 9-, and the 9- and 11-year old groups but not at the older age

levels. From this he concluded that the structure of written language is rapidly developed because it is based upon previously developed maturity in spoken language. It would be interesting to investigate whether the reported maturity of hearing children in written language syntax would be evident at an even younger age than 11 if errors of punctuation were not included in the Syntax score.

Wells (1942), using written samples of deaf and hearing subjects and performance on a completion test, attempted to trace differences in growth of abstract language forms. He concluded that the deaf function in abstract language on a level similar to that of younger hearing children; they displayed comprehension equal to that of the hearing for concrete words but were retarded from four to five years in understanding abstract terms. Conjunctions and adverbs were commonly omitted, resulting in the type of expression observed in the verbal utterances of young children and characterized by Brown and Fraser (1963) as "telegraphic." It should be noted, however, that the telegraphic nature of the utterances of young hearing children differs from the writing of deaf children. Although in both cases messages are cut down and words omitted, the patterns of word combinations used and the types of omissions vary between the two groups.

Simmons (1959) used a type-token ratio (TTR) to determine the relative flexibility or rigidity of deaf and hearing subjects in word usage. Five written compositions and one spoken composition, elicited by picture sequences, of 54 students at the Central Institute for the Deaf and 112 hearing students attending public schools in the

St. Louis area were studies. The type-token ratio (TTR), a measure of vocabulary diversity, is computed by dividing the number of different words (types) in a language sample by the total number of words (tokens). As a result of her analysis, Simmons emphasized the redundancy found in the language of deaf children. Commenting on the rigid and stereotyped expression employed by the deaf as constrasted to the richness of the language of hearing children, she used the following example (p. 35) to illustrate how even relatively grammatically correct sentences are frequently stilted and repetitive:

> A girl threw a ball to a boy. The boy bat a ball. The boy bat the ball to the window and the window was broken. The mother heard the boy broke the window. The mother saw a broke the window. She went to see the ball game.

Simmons commented that deaf children would repeatedly refer to the child in a picture as a boy, where the hearing children would call him the kid, boy, urchin, friend, young man, youngster, him, Tom, etc. She also reported a lower TTR for Class II words due to a tendency for repetition of four verbs--have, he, go and feel. A glance at the example presented above also illustrates the relatively low TTR found in the use of determiners. Although, like the deaf, hearing children frequently used a, an and the, other definite articles such as these, that, and those, and possessives were also employed by the hearing.

Tervoort (Tervoort, 1967; Moores, 1970a) investigated the ingroup communication of students ranging from 7 to 17 over a six year period in four schools for the deaf: two in the United States, one in Belgium and one in the Netherlands. He filmed the conversations of pairs of students informally interacting. Tervoort reported that among

themselves the children conversed in a relaxed fluent manner, using their hands regularly sometimes with and sometimes without speech. Their communication with normally hearing individuals, on the other hand, frequently showed hesitance, awkwardness and embarrassment. Tervoort attempted to study the relationship between what he perceived as two separate systems and concluded that the private, or esoteric, system is predominant for younger children and is the main reason for the stereotypes mistakes which characterize the children's attempts to use the language of the adult society, termed the exoteric system. The exoteric system influences the esoteric even at an early age to the extent that normal vocabulary and structure penetrate into private communication.

Tervoort reported a consistent growth in grammatically correct usage through the elementary years. American students continued to improve through adolescence in contrast to the students in the Benelux schools. American students showed the influence of the exoteric system by their more efficient use of word order, auxiliary verbs, conjunctions and other function words, especially prepositions. Only 2% of the utterances of the American children consisted of imitative gesture sentences as compared to 10% of the European total.

At all ages the most common mode of expression was the use of signs, with fingerspelling increasing with age. Speech, when used, was most frequently combined with signs and spelling. At first the results seem contradictory. The subjects continue to use esoteric means (signs and spelling) but use them increasingly within the context of an exoteric grammatical (English or Dutch) structure. Tervoort resolves the paradox to his own satisfaction by treating speech and

language as functionally separate. In support of his thesis he claimed the data showed no consistent relationship between speech and language, i.e., some children showed good articulation and poor grammatical skills and some had poor articulation but adequate grammatical abilities. All possible combinations existed.

Two explanations for the superiority of the American students in language, but not necessarily speech, have been advanced. First is the suggestion that the influence of a structured approach to teaching language is evident in the sentences of the American students and appears to be more beneficial in terms of grammar than the "natural language" approach employed in the European schools. Another possible factor, which raises the question of the effect of manual communication on the development of speech and language skills, is the availability of an arbitrary system for the American students. Tervoort has presented his findings as a challenge to exclusively oral methods of instruction (1967). The investigator states: (p. 148)

> ------the sign language of the American adult deaf is a source from above, strongly influencing the interchange of the deaf teenager, on campus too, and on the contrary the fact that no such source from above is available for their mates across the ocean with whom they are matched. Once the esotericity of at least part of the subjects' private communication is established as a fact (whether this is a fact that should have been prevented, should be corrected, or even denied, is not the issue here), it is evident that normal need for communication finds a better outlet in an adult arbitrary system, than in uncontrolled and half-grown symbolic behavior not fed from above. In educational terms:----- it seems clear that the choice has to be: either well controlled, monitored signing tending towards an adult level, semantically and syntactically, or no signing whatsoever; but no signing that is uncontrolled and left to find its own ways.

Johnson (1948) reported on the ability of 253 children in the Acoustic (hard of hearing), Oral, and Manual departments of the Illinois School for the Deaf to understand various methods of communication.

All children were given tests of reading, speech-hearing ability, speechreading ability, hearing plus speechreading, fingerspelling only, and signs plus fingerspelling. The results suggested that the Acoustic group functioned most effectively. For the three groups as a whole only fingerspelling, with a mean score of 74%, and reading, with a mean of 72%, were reasonably successful. Johnson recommended that fingerspelling be added to the instructional method with the Oral group and that it be emphasized even more, in relation to signs, with the Manual group. Her findings were similar to those of Montgomery (1966) who studied 59 prelingually deaf Scottish students and reported that a mere 7% could produce fairly fluent intelligible speech and 25% could follow a normal conversation reasonably well by speechreading. Even though officially no form of manual communication was allowed in the classroom, Montgomery found that 71% of the students could communicate fluently by means of the finger-alphabet.

Studies of Receptive Language

Results of investigations on performance on standardized tests of reading achievement suggest that deaf children are also retarded in the ability to decode linguistic signs. Wrightstone, Aronow, and Moskowitz (1963) tested 5,307 deaf students in the United States and Canada between the ages of 10-6 and 16-6 on the Metropolitan Achievement Test, Elementary Level, in Reading and found that less than 10% read on a fourth-grade level. They estimated that 54% of all eligible children with performance I.Q.'s of 75 or above were tested. In emphasizing the linguistic deficiencies of the deaf, Furth (1966, p. 54) notes that in comparison with hearing norms the data published by Wrightstone, Aronow and Moskowitz indicated that the mean reading

score of the deaf rose between the ages of 11 and 16 from a grade equivalent of 2.6 to 3.4, that is, less than one year improvement in five years of schooling.

Myklebust (1964), using the Columbia Vocabulary Test as a measuring instrument, compared the reading vocabulary of deaf and hearing children at four age levels. The average score of 11.32 for the deaf students at age 15 was inferior not only to the score of his hearing contemporary, but was also inferior to the average score of 21.37 made by the 9-year-old hearing group. Another point of interest is the large increase in mean scores achieved by the hearing subjects at each successive age level. The improvement in the scores for the deaf, on the other hand, appears to taper off between the ages of 13 and 15, presenting a situation in which the hearing children are consistently consolidating and increasing their relative superiority in reading vocabulary. Goetzinger and Rousey (1959) in a study of 101 students at a residential school for the deaf concluded that deaf children of average mentality tend to plateau between the ages of 14 and 21 at grade 5 in Vocabulary and Paragraph Meaning as measured by the Stanford Achievement Test. Magner (1964) reported that the 11 members of the graduating class of the Clarke School, a private residential school for the deaf, achieved reading scores at the sixth-grade level on the Stanford Achievement Test.

Pugh (1946) established reading norms for the deaf at different age levels on the Iowa Silent Reading Test on the basis of the performance of students at 54 day and residential schools for the deaf. In her standardization no group scores above seventh-grade level on any of the subjects. Her finding that improvement in reading achievement

scores was slight from the seventh to thirteenth year of schooling, and that during this period the gap between the hearing and deaf is widened, is in agreement with the previously mentioned studies of Goetzinger and Rousey, Myklebust, and Wrightstone, Aronow and Moskowitz.

An amount of justifiable criticism has been leveled at the use of reading achievement test scores as a measure of linguistic proficiency for deaf students. Cooper and Rosenstein (1966) have made the point that a person may be illiterate and unable to respond to the demands or a reading test, which measures skills commonly acquired in the educational process, and still possess a high degree of linguistic competence. This is usually the case with normally hearing children who typically enter school without the skills necessary for reading proficiency but who may be assumed to possess relatively sophisticated morphological and syntactical abilities.

The difficulty of interpreting a reading achievement score is compounded in the case of a deaf child. The tests have been standardized on hearing subjects and assume the presence of a base of linguistic competence. The normally hearing child already has at his disposal predicative integrations by which he is capable of handling automatically the structure of his language. Even by the age of six he has mastered the basic foundations of morphology. For him, performance on a standardized reading test is less an indication of linguistic proficiency, which has been established prior to the initiation of instruction in reading, than it is a measure of skills necessary for the reading process. The deaf child does not have a comparable linguistic competence built up as a function of the redundancy, frequency, and

contiguity of auditory input variables. He has not internalized the structure of his language. Thus, given a relatively low score in reading achievement for a deaf child, it is difficult to ascertain the extent to which the basic weakness may be attributed to inadequate language facility or to poor development of skills basic to reading proficiency. With deaf subjects, mastery of the structure of language cannot be an assumed base.

Performance scores of deaf children on standardized tests of reading, despite their relative inferiority to scores for the hearing, may give a spuriously inflated estimate of the language capabilities of deaf subjects. Standardized reading tests require a multiple choice response; the student is instructed to select the most appropriate of four or five alternatives. The range of choices typically falls within one of the five general grammatical classes, i.e., nouns, verbs, adjectives, adverbs, or function words, and thus limits the selection procedure to a grammatically correct subset. Such a procedure, by failing to account for grammatical insufficiencies, might tend to artificially raise estimates of reading ability in many deaf children. In relation to this, Fusfeld (1955) found a discrepancy between apparent command of language as measured by the Stanford Achievement Test and written compositions of 18- and 19-year-old deaf students entering the preparatory class at Gallaudet College which reported median achievement scores of grade 6 for Vocabulary and grade 8 for Paragraph Meaning, both well above the levels reported in other studies. In spite of the relatively high reading achievement scores of this group, however, Fusfeld stated (p. 70) that the written compositions submitted by the students represented a "tangled web type of expression in which words occur in profusion but do not align them-

selves in orderly array."

Moores (1970b) investigated the sensitivity of Cloze procedures in differentiating between deaf and hearing students matched on reading achievement scores. The experimental group consisted of 37 students with an average age of 16 years 9 months and mean grade reading achievement of 4.77 on the Metropolitan Achievement Test. They were matched with 37 fourth-grade hearing students with an average age of 9 years and 10 months and a mean grade reading achievement of 4.84. Three passages of 250 words were chosen from fourth-, sixth-, and eighth-grade textbooks and every fifth word deleted. Subjects were instructed to fill in the blanks with most appropriate words. Responses were scored for each passage for (a) verbatim reproduction - replacing the exact word deleted from the text, (b) form class reproduction - supplying a word of the same grammatical class as the original word; and (c) verbatim given form class reproduction - the percentage of correct verbatim responses given correct form class responses.

Results showed the hearing group to be superior on all measures. The inferiority of the deaf on verbatim scores supported the argument that standardized reading scores overestimate general language ability of the deaf. The form class scores suggest that at least part of the inferiority may be explained by inadequately developed grammatical structures. By scoring subjects on the basis of verbatim given form class scores, it was possible to compare the vocabulary level of the groups while holding grammatical proficiency constant. The lower performance of the deaf group on this measure indicated that, in addition to poorly developed grammatical skills, the deaf are further handicapped by redundant stereotyped modes of expressions and limited vocabulary.

In a partial replication of the Moores study, Marshall (1970) used the Cloze procedures to compare 24 deaf students with a mean grade reading level of 4.5 to 24 hearing students with a reading level of grade 4.4. Marshall reported that the hearing students were superior on verbatim, form class and verbatim-given-form class scores. The differences were statistically significant with a probability of less than .01 for the first two measures but did not reach significance for the verbatim-given-form class scores.

Schmitt (1969) used a transformational-generative model of language to explore the abilities of 8-, 11-, 14-, and 17-year-old deaf children to comprehend and produce sentences varying on the dimensions of transformations (Kernal, Negative, Passive, Passive-Negative) and tense (past, present progressive, future) and to contrast them with 8- and 11-year-old hearing students. Examples of the four transformations are presented in Table 1. Both groups of hearing children were superior to the deaf subjects at all ages. Qualitative analysis of the data led Schmitt to postulate that the deaf children were using incorrect underlying rules to process sentences and that three rules could account for most errors. He designated these: (a) the $NP_2 - NP_1$ Rule, which permits reversal of Noun Phrase 1 and Noun Phrase 2 in transitive verb, reversible sentences; (b) the Passive-Active Rule, which specifies the ignoring of passive transformation markers and permits the processing of passive sentences as actives; and (c) the No Negative Rule, which specifies the ignoring of negative markers and permits the processing of negative sentences as positives. Examples of the three incorrect processing rules are presented in Table 2.

TABLE 1

Examples of Four Basic Transformations

Transformation	Example
Kernal	The dog chased the cat.
Negative	The dog did not chase the cat.
Passive	The cat was chased by the dog.
Passive-Negative	The cat was not chased by the dog.

TABLE 2

Examples of Basic Incorrect Underlying Rules

Used by Deaf Children in the Processing of Sentences

Incorrect Rule	Original Sentence	Child's Interpretation
NP_2 - NP Rule	The boy hit the girl.	The girl hit the boy.
Passive-Active Rule	The cat was chased by the dog.	The cat chased the dog.
No Negative Rule	The dog was not chasing the cat.	The dog was chasing the cat.

METHODOLOGY

The Methods Controversy

The methods controversy, which has been raging for over 200 years, perhaps has accounted for more confusion than any other question concerned with the hearing impaired. The issues have been distorted beyond recognition, and it is not surprising that these are misunderstood by professionals on the periphery. It is inaccurate to speak of an Oral-Manual controversy because no present day educators of the hearing impaired advocate a "pure" or "rigid" manual position. All educators of the hearing impaired in the United States are oralists and all are concerned with developing the child's ability to speak and understand the spoken word to the highest degree possible. The difference is between Oral-alone educators, who argue that all children must be educated by purely oral methods, and the Oral-plus educators who argue that at least some children would progress more satisfactorily with simultaneous or combined oral-manual presentation. At present, although variations exist, four basic methods of instruction may be identified in the United States: The Oral Method; the Auditory Method; the Rochester Method; and the Simultaneous Method;

1. Oral Method In this method, also called the Oral-Aural method, the child receives input through speechreading (lipreading) and amplification of sound and he expresses himself through speech. Gestures and signs are prohibited. In its purest form reading and writing are discouraged in the early years as a potential inhibitor to the development of oral skills.

2. Auditory Method This method, as opposed to the Oral, is basically unisensory. It concentrates on developing listening skills in the child who is expected to rely primarily on his hearing. Reading and writing is usually discouraged in the child as is a dependence on speech reading. Although developed for children with moderate losses some attempts have been made to use it with profoundly impaired children.

3. Rochester Method This is a combination of the Oral Method plus fingerspelling. The child receives information through speechreading, amplification, and fingerspelling, and he expresses himself through speech and fingerspelling. Reading and writing are usually given great emphasis. When practiced correctly, the teacher spells in the manual alphabet every letter of every word in coordination with speech. A proficient teacher can present at the rate of approximately 100 words per minute. This approach is quite similar to the system of Neo-Oralism developed in the Soviet Union.

4. Simultaneous Method This is a combination of the Oral Method plus signs and fingerspelling. The child receives input through speechreading, amplification, signs and fingerspelling. He expresses himself in speech, signs and fingerspelling. Signs are differentiated from fingerspelling in that they represent complete words or ideas. A proficient teacher will sign in coordination with the spoken word, using spelling to illustrate elements of language for which no signs exist, e.g., some function words such as of, and, the, and indications of some verb tenses. This method has been limited to use with children with profound losses.

Recent Trends

Until quite recently, the Oral Method has been predominant. Its ascendency may be traced as far back as the International Congress on Deafness in Milan, Italy in 1880 in which a resolution was passed stating the use of manual communication of any kind would restrict or prevent the growth of speech and language skills in deaf children.

Almost without exception programs for the deaf have followed a completely oral approach. This includes even the "manual" schools in which simultaneous methods of instruction typically have not been introduced into the classroom below the age of 12. In view of this it might be argued that the history of failure of education of the deaf is a history of failure of the completely oral method, that it is more appropriate for children with moderate to severe losses than for those with severe to profound losses. A spate of articles (Karlin, 1969; Bruce, 1970; Miller, 1970) appearing in the Volta Review, an American journal dedicated to the advancement of oral methods, has

reacted to such an interpretation.

Although one of the goals of education of the hearing impaired is to produce children proficient in speech and speechreading, the possibility must be faced that rigid adherence to learning language by means of speech and speechreading, even with the best of auditory training, might be self-defeating for some children. A straight oral approach is combined to teaching language through speech and speechreading although research indicates (Lowell, 1957-58; Lowell, 1959; Wright, 1917) that a primary requisite for speechreading is grammatical ability. Deaf people, after years of training in speechreading cannot speechread as well as hard of hearing people (Costello, 1957) because they lack the ability to utilize context and anticipate, integrate and interpret in consistent grammatical patterns those sounds, words, and phrases which are difficult to distinguish from the lips. Many distinct sounds in English either look like other sounds (e.g., [p], [m], [n]), or present very limited clues (e.g., [k], [g], [h]). The less residual learning the individual possesses, the more difficult decoding becomes. The task of a speechreader, then, is a complex one; to understand utterances he must differentiate between sounds that look similar on the speaker's lips and at the same time perform closure; i.e., fill in, on parts of the message which are not readily available to the eyes. A.G. Bell, a leading exponent for the development of oral skills in hearing impaired children, was aware of these difficulties and was quoted (DeLano, 1923) as stating:

> Spoken language I would have used by the pupil from the commencement of his education to the end of it; but spoken language I would not have as a means of communication with the pupil in the earliest stages of education, because it is not clear to the eye and requires a knowledge of language

> to unravel the ambiguities. In that case I would have the teacher use written language and I do not think that the manual language (fingerspelling) differs from written language except in this, that it is better and more expeditious.

The Auditory Method, in its unisensory form, can be traced to the success of people such as Eedenberg (1954) in Sweden and Whetnall and Fry (1964) in Great Britain with severely hard of hearing children. The Auditory Method in the United States and Canada, patterned after the work in Western and Northern Europe, has been used mostly with preschool aged children (Stewart, Downs, and Pollack, 1964; Griffith, 1967; Ling, 1964; McCroskey, 1968) and some attempts have been made to extend it to even the most severely hearing impaired child (Stewart, Pollack and Downs, 1964; Griffith, 1967; McCroskey, 1968).

The work of Gaeth, who has been studying the effects of unimodal and bimodal sensory presentation since 1957, is of great relevance to consideration of the Oral (Bimodal) and Auditory (Unimodal) Methods. The results of investigations (1963, 1966) with deaf, hard of hearing, and normally hearing students suggest that bimodal presentation is never better than the better of two unimodal presentations and that in bimodal presentation attention is directed to the modality which is most meaningful. The results contradict the finding of Numbers and Hudgins (1948) that bimodal presentation (look and listen) was superior to visual (look) or auditory (listen) alone. It is possible Numbers and Hudgins, in comparing groups, overlooked individual differences and interaction effects. Within any groups of students with varying degrees of hearing impairment some may be oriented towards vision and some towards audition, a factor not readily apparent using group statistics.

Gaeth (1966) reported that hard of hearing subjects, defined as having a loss less than 60 db in the better ear, although somewhat inferior, functioned much as normal subjects in that they attended to the modality, either visual or auditory, which was most meaningful. There was some indication that the performance of the hard of hearing group in the bimodal situation was affected by a confusion as to which modality was more meaningful. Deaf students, defined as those with a loss greater than 60 db in the better ear, attended to the visual modality.

As opposed to possible interference between simultaneous bimodal presentation, Broadbent (1967) and Gaeth (1966) report no inhibition in the use of two stimuli presented simultaneously to the same modality. If so, this could lend support to the simultaneous use of speech and fingerspelling or speech, signs, and fingerspelling for children with severe losses. However, at present, the relative efficacy of multisensory stimulation has not been adequately studied and the implications of Gaeth's work to the education of the deaf remains unclear. Also, research has concentrated on simultaneous auditory-visual input. There is no justification for generalizing from these data to other types of stimulation such as auditory-kinesthetic or visual-haptic stimulation.

Whetnall and Fry were especially effective in promoting the educational separation of deaf and hard of hearing children and in providing services for more hard of hearing children within the regular public school situation in Great Britain. The benefits for the hard of hearing child were immediate. Separate treatment of the deaf child has served so far only to point up the extent of his failure.

In a survey of children born in 1947 who were in schools for the deaf in Great Britain in 1962-63 it was reported (1964) that only 11.6% of the students could carry on a reasonably clear conversation in speech and speechreading.

The question of methodology was deemed serious enough to appoint a committee to investigate the possible use of signs and fingerspelling in Great Britain. The result, commonly referred to as the Lewis Report (1967), concluded that more study was needed. An interesting sidelight to the Lewis Report was the enthusiastic reaction of educators sent to observe programs in the Soviet Union, which had rejected as unsatisfactory traditional oral methods in favor of Neo-Oralism, a combination of speech and fingerspelling similar to the Rochester Method in the United States. The observers reported: (1967, pages 44 and 45):

> 'The children of four, five, and six years old whom we saw in class certainly understood their teacher well, and mostly spoke freely and often with good voice, although they were regarded as being profoundly deaf and were unselected groups. We could not judge the intelligibility of the speech, but our interpretor (who had never previously seen a deaf child) said that she could understand some of them. The children were also very lively and spontaneous, and did not appear to be oppressed by the methods used, which might strike someone accustomed to English methods as unsuitable for young children.
>
> 'It appeared to us, from what we were shown, that the Russians are more successful than we are in the development of language, vocabulary and speech in deaf children once they enter the educational system. This seemed to us a strong point in favor of their method (use of fingerspelling from the very start as an instrument for the development of language, communication and speech), the investigation of which was the main object of our visit.'

Their enthusiasm matched that of Morkovin's (1960) observations after visiting the Soviet Union. The Russians claim by starting

fingerspelling in the home and nursery at age two the child is able to develop a vocabulary of several thousand words by six years of age. They also report that, rather than inhibiting oral development, the use of fingerspelling enhanced speech and speechreading skills. The claims have created a renewed interest in the Rochester Method which was first used in the United States in 1878 at the Rochester, New York, School for the Deaf (Scouten, 1942). Anecdotal substantiation is provided by the case of Howard Hofsteator (1959), a deaf individual whose parents provided him an early language environment through fingerspelling all conversations. They would read to him from books by placing their hands close to the printed page, spelling the stories, enabling him to read at a very early age. Several preschool programs using the Rochester Method have recently been developed in the United States and their numbers appear to be increasing.

A reservation concerning the use of the method with young children should be noted. Possibly the presentation of connected English by means of rapidly changing hand configurations would place too great a burden on the perceptual and cognitive abilities of a child. His ability to form letters manually may also be limited. No such difficulty was encountered by Hofsteator but perhaps he was an exceptional case. It might be more beneficial to develop pivot-type grammars by means of selected signs, later placing an emphasis on spelling congruent with the introduction of the printed word after the age of three.

The possible use of the Simultaneous Method with very young children is also gaining support throughout the country, a support which may be traced to a number of factors. Among these are: (a) the evidence that

deaf children with deaf parents achieve more than those with hearing parents; (b) the growing tendency to accept the language of signs as a legitimate mode of communication; (c) dissatisfaction with results of traditional methods with the profoundly deaf; (d) the increasing militancy of deaf adults who are only beginning to make an impact on the field, the majority of whom, despite their own rigid oral training, strongly support the use of the Simultaneous Method. The Deaf American, a journal produced by deaf professionals, has been particularly active on this question. It is interesting that the first public school program, in 1968, to use the Simultaneous Method with young deaf children, Santa Ana, California, was also the only program for the hearing impaired in the United States at the time to be directed by a deaf person.

Research and Opinion on Methodology

In view of the frequent bitterness involved in the methods controversy, it is somewhat surprising to find that until 1965 objective research was almost non-existent. Most of the available literature still primarily consists of position papers in favor of one or another of the various methodologies. A situation worthy of note is the fact that while most educators of the hearing impaired have preferred straight oral methods, many psychologists, psychiatrists and "outside" educators who, for one reason or another, have become interested in the problems of limited hearing argue for some form of manual communication (Moores, 1970b).

In a paper presented to the International Conference on Oral Education of the Deaf, Lenneberg (1967) stressed that the primary goal of education must be language, not its subsidiary skills. Lenneberg went

on to criticize educators of the deaf for not distinguishing between speech and language. Stressing that the key is to get as many examples of English into the child as possible, he developed the argument that the establishment of language is not inseparably bound to phonics and, echoing Bell's earlier cited position (Deland, 1923), urged that graphics, (reading and writing) be introduced in addition to oral methods at the earliest possible time. Lenneberg included finger-spelling and signs within his definition of graphics. Lenneberg's theoretical position is consistent with Tervoort's (1967) finding that manual communication had no deleterious effects on speech. It should be emphasized that both Lenneberg and Tervoort recognized the primary importance of oral communication in our society. They advocate balanced, as opposed to rigid manual or rigid oral, communication. Their position, of course is in direct opposition to the Congress of Milan.

In his study of the relationship of manual and oral skills, Montgomery (1966) came to the same conclusion based on the findings that: (a) No negative correlations existed between any measures of oral skills and manual communication ratings; (b) positive significant correlations were recorded between the manual communication rating and the Donaldson Lipreading Test. In his discussion, Montgomery states (p. 562), "There thus appears to be no statistical support for the currently popular opinion that manual communication is detrimental to or incompatible with the development of speech and lipreading."

Kohl (1967), more widely known for his work in education of urban children, produced a highly controversial study on language and education of the deaf. Equating the position of the deaf to a large

extent to that of a disadvantaged group, Kohl noted that although not one school officially taught sign language, it was the means of communication used by most deaf children with each other, no matter what the educational policies of the particular school. Kohl argued that teachers of the deaf should master sign language and utilize it in the schools with oral language used as the child's second language occupying more of the curriculum as he grows older. Kohl's suggestions drew a storm of protest. It was dismissed by Quigley (1969, p. 18) as representative of ".....support for the use of manual communication by individuals with only a superficial knowledge of the problems of education of deaf children, who apparently believe that the use of manual communication will correct most of the inadequacies of the educational system". According to a follow up report on Kohl's study (Lederer, 1968), reaction was violent to an extreme. The editor of the Volta Review "attempted to discredit Kohl as patently unqualified to write or speak on the subject" (page 8). The superintendent of an exclusively oral school in New York was quoted (page 10) as dismissing Kohl's work as an "expanded master's thesis" and as agreeing only to answer specific questions put to him by a bonafide specialist on the deaf.

In a less emotional vein, Quigley (1969) attempted to assess the effects of the Rochester Method (oral plus fingerspelling) on achievement and communication in two studies. The first involved a comparison over five years of three residential schools receiving instruction at the high school level in the Rochester Method matched with three control schools in contiguous states. The experimental group was superior on fingerspelling an no differences were found in speechreading

or speech intelligibility. The experimental group scored higher on all subtests of the Stanford Achievement Test with an overall battery median of grade 5.88 compared to 5.04 for the contrast schools. In various analyses of written language one statistically significant difference, Grammatical Correctness Ratio, in favor of the experimental group, was found. Applications of Moores' (1967) Cloze procedures revealed the experimental groups to be superior in form class (grammatical functioning) with no differences in verbatim and verbatim-given-form class performance.

Quigley reported that in two of the three experimental schools studied the Rochester Method was not introduced until age 12. The school which used the method with children beginning at a younger age was the one which enjoyed the greatest advantage relative to its control (p. 77). Quigley's second study involved a comparison of two preschool programs for the hearing impaired, one using the Rochester Method and one a traditional oral. After four years of instruction, as shown in Table 3, Quigley reported that the students taught through the Rochester Method were superior in fingerspelling, in one of two measures of speechreading, in five of seven measures of reading and three of five measures of written language. The control group received superior scores on Grammatical Correctness Ratio, which was attributed to a function of their limited language production (page 89).

Quigley drew the following implications from the two studies:

1. The use of fingerspelling in combination with speech as practiced in the Rochester Method can lead to improved achievement in deaf students particularly on those variables where meaningful language is involved.

Table 3

Achievement of Hearing Impaired Children Receiving Preschool Instruction in the Rochester and Oral Methods

	Students Taught by Rochester Method (N = 16)		Students Taught by Oral Method (N = 16)			
	Mean Score	S.D.	Mean Score	S.D.	t.	Level of Significance
AGE	7.81	0.40	7.85	0.68	0.34	----
FINGERSPELLING	33.71	21.60	2.34	3.74	8.32	.001
SPEECHREADING						
Craig Word	44.85	16.73	39.79	14.81	1.06	----
Craig Sentence	37.73	12.02	23.21	9.78	3.42	.01
READING						
SAT Paragraph	2.28	.53	2.10	.68	1.49	----
SAT Word Meaning	2.31	.50	2.02	.61	2.81	.01
SAT Combined Reading	2.27	.49	2.04	.57	2.19	.05
Metro. Word Knowledge	2.09	.59	1.83	.57	2.69	.02
Metro. Reading	1.96	.54	1.70	.62	3.35	.01
Gates Vocabulary	2.21	.81	1.68	.64	2.55	.02
Gates Comprehension	2.00	.61	1.74	.59	1.57	----
WRITTEN LANGUAGE						
Total Words Written	61.53	29.24	37.47	18.54	2.46	.02
Sentence Length	5.79	1.60	4.49	1.44	3.45	.01
Strings Analysis	3.59	1.16	4.07	1.36	1.52	----
Subordination Ratio	3.23	6.41	2.22	7.61	2.94	.01
Grammatical Correctness Ratio	79.53	19.70	89.33	21.82	2.42	.05

2. When good oral techniques are used in conjunction with fingerspelling there need be no detrimental effects on the acquisition of oral skills.
3. Fingerspelling is likely to produce greater benefits when used with younger rather than older children. It was used successfully in the experimental study with children as young as three and a half years of age.
4. Fingerspelling is a useful tool for instructing deaf children, but it is not a panacea.

Deaf Children With Deaf Parents

The influence of the work of people such as Tervoort, Lenneberg, Montgomery, and Kohl in recent years has resulted in a renewed interest in the use of combined methods in the education of at least some hearing impaired children. Because of the relatively small number of programs using any form of manual communication with young children some investigators have turned to the study of deaf children who have received manual communication in the home, those with deaf parents.

Stevenson (1964) examined the protocols of all 134 children of deaf parents enrolled at the California School for the Deaf at Berkeley between 1914 and 1961 and matched them to deaf children of hearing parents. He reported that 38% of those with deaf parents went to college compared to 9% of those with hearing parents and that of the 134 paired comparisons those students with deaf parents were better students and had attained a higher educational level in 90% of the cases.

Stuckless and Birch (1966), in a matched pair design, compared 38 deaf students of deaf parents to 38 deaf students of hearing parents

from five residential schools for the deaf. The deaf parents had used the language of signs with their children as babies. Pairs were matched on age, sex, age of entrance to school, extent of hearing impairment and intelligence test scores. No differences between the groups were found on speech intelligibility or teachers' ratings of psychosocial adjustment. Children with deaf parents were superior on measures of speechreading, reading, and written language.

In an unplanned ramification of a study of the effects of institutionalization, Quigley and Frisina (1961) studied 16 deaf students of deaf parents from a population of 120 deaf day students. They reported that the group with deaf parents were higher in fingerspelling and vocabulary with no differences in educational achievement and speechreading. The group with hearing parents had better speech.

Meadow (1966) compared 59 children of deaf parents to a carefully matched paired-group of children with hearing parents. She reported that children with deaf parents ranked higher in self-image tests and in academic achievement showed an average superiority to their matched pairs of 1.25 years in arithmetic, 2.1 years in reading, and 1.28 years in overall achievement. The gap in overall achievement increased with age, reaching 2.2 years in senior high school. Ratings by teachers and counselors favored children with deaf parents on (a) maturity, responsibility, independence; (b) sociability and popularity; (c) appropriate sex-role behavior; (d) responds to situations with appropriate reactions. In communicative functioning the group with deaf parents was rated superior in written language, use of fingerspelling, use of signs, absence of communicative frustration, and willingness to communicate with strangers. No differences were reported for speech or lipreading ability.

In a commentary on the child's reaction to deafness, Meadow claimed (p. 306) that children with hearing parents viewed their deprivation in terms of an inability to speak rather than an inability to hear. Children of hearing parents tend to ask questions regarding their deafness at a later age than children of deaf parents.

Vernon and Koh (1970) matched 32 pairs of genetically deaf children for sex, age, and intelligence. One group had deaf parents and had been exposed to manual communication from infancy. The other group, consisting of recessively deaf children, had hearing parents and had no early exposure to manual communication. On a standardized achievement test the early manual group's general achievement was higher on the average by 1.44 years. They were also superior in reading, vocabulary and written language. No differences were found in speech, speechreading or psychosocial adjustment.

The results reported by Stevenson, Quigley and Frisina, Stuckless and Birch, Meadow, and Vernon and Koh, interesting in themselves, should be evaluated in relation to the richer environment to which children of hearing parents theoretically should be exposed. The socio-economic status of children with hearing parents is superior; e.g. Meadow had to equate deaf fathers who were skilled craftsman with professional, managerial, clerical and sales workers among the hearing fathers. The language and speech limitations of deaf adults have been documented extensively. In addition, deaf children of hearing parents are far more likely to receive preschool training and individual tutoring. Meadow reported that 60% of the children with deaf parents received no preschool training as compared with only 18% of those with hearing parents. Half of the group with hearing parents

not only attended preschool but had additional experience either at home or at a speech clinic (p. 272). Almost 90% of the hearing families interviewed in the study had had some involvement with the Tracy Correspondence Course, offered by the John Tracy Clinic in Los Angeles, California, but none of the deaf families had sent for it. Given the higher socio-economic levels, more adequate linguistic and speech skills, and higher academic attainments to be found in the hearing families in addition to preschool educational and speech training for children with hearing parents, the educational, social, and communicative superiority of those with deaf parents takes on added significance. One can only speculate on the attainments of deaf children with hearing parents if, in addition to other advantages, they had benefited by early systematic communication with their parents.

PRESCHOOL PROGRAMS

Consistent with developments in other areas, educators of the hearing impaired have been turning with more and more emphasis to the development of programs for children below the age of five. The main reasons for such a movement may be traced to the increased awareness of the importance of the first five years of life, to dissatisfaction with results obtained with older children and to growing awareness and appreciation of the tremendous potential of very young children which has been documented by modern research in psycholinguistics, perception and cognition. Of perhaps more importance then purely methodological considerations, which have already been discussed extensively, are what might be referred to as the two different philosophies of education which are developing in preschool programs for the hearing impaired.

The first philosophy has its roots in the pioneering work of educators of the hearing impaired in Western Europe, with much of the leadership coming from Great Britain. This may be labeled the Home Centered Socialization philosophy. Attention is focused on activities around the home and a "natural-language" environment is emphasized. Parent guidance is a major aspect of such a program and physical placement contiguous to hearing peers is usually an essential component. Stress is placed on the spontaneous development of language skills and speech skills. Descriptions of such programs may be found in the writings of Pollack (1964), Reed (1963), Griffith (1967), and Knox and McConnell (1968).

The second major philosophical approach, which may be labeled Child-Centered, Cognitive-Academic, is exerting influence on many new programs. The impetus has grown out of the failure of traditional socially-oriented preschool and nursery programs to serve disadvantaged children in the United States and, to a lesser extent, Israel. Beginning in 1966, a number of research investigations have suggested that the only successful programs for the disadvantaged have been those which contain a highly structured component with specific academic-cognitive training. The work of investigators such as Bereiter and Englemann (1966), DiLorenzo (1969), and Karnes, et al. (1969) have had the greatest impact.

As the work of these researchers has become more widely known among educators of the hearing impaired, a change in the orientation of many systems toward increased attention to the development of cognitive academic skills has been witnessed. Generalizing from the few programs of such a type presently in existence, the focus may be

expected to shift from the parent to the child and skills such as reading readiness and number concepts would be begun as early as two years of age. Moores (1970c) has described a public school program for the hearing impaired developed on these principles.

Related Research

The paucity of educational research with the hearing impaired is especially marked in regard to the effectiveness of various intervention programs for the very young hearing impaired child. Most of the literature cited as research or "proof" for the benefits of one approach or another may more properly be classified as program description. The typical article or paper involves a program being described, defended and praised by a person who has developed it or who in some way is closely related to it. With the exceptions of an occasional tape or audiogram, no data are presented. Position papers and descriptive works can serve an important function, but too often they have been treated as evidence.

In the few attempts at assessment, measured benefits have been negligible. Comparisons of children receiving traditional preschool training with children having no preschool training suggest a wash out effect (Phillips, 1963; Craig, 1964). By nine years of age there appear to be no differences between experimental and control groups. The results are consistent with those reported for traditionally based preschool programs for the disadvantaged. One of two conclusions may be reached. The first is that such a preschool experience is of no benefit to the children. The second holds that such experience was effective but its benefits were dissipated by the failure of the schools to take advantage of them in the primary grade years.

McCroskey (1968) compared children who participated in a home-centered program with auditory emphasis to children who received no training and found few differences between the groups. What differences existed tended to favor the control group, those with no previous training. The investigator postulated that the experimental group consisted of a "basically inferior product" which had been brought to a position of equality with the control group. However, this must remain conjective.

The only study which directly compared preschool hearing impaired children receiving instruction under two different methodologies has been discussed, Quigley (1969) reported that children being taught by the Rochester Method (Oral plus fingerspelling) were superior to those taught by the Oral-only method.

The lack of research studies is not surprising considering that the difficulties of evaluation of any type of educational intervention are multiplied when dealing with the preschool hearing impaired. Underlying the hostility and suspicion endemic to the field is the tremendous complexity of the task only hinted at by some of the following questions. How does one measure the speech language, and communication ability of 3-, 4-, and 5-, year-old children with severe hearing impairments? Are there any valid measures of parent attitude? Are differential programatic effects transitory? Do or can children in one program who are behind at age four in one area close the gap by age eight? Is it possible to develop measurement techniques which will be fair to children in programs which have different goals and therefore different concepts of success?

The University of Minnesota Research and Development Center has

attempted to meet the problem (Moores, 1970d) by adapting Cronbach's (1957) Characteristics by Treatment Interaction Model to an assessment of 12 different programs for the hearing impaired in the United States. Cronbach has argued that group comparisons are of limited value because they frequently hide individuals effects and because they are geared toward finding the one "best" approach for a particular educational problem such as "basal" vs. "linguistic" instruction, oral-aural vs. aural-only instruction of the hearing impaired, segregated vs. integrated classes for the retarded, etc. Looking only for group differences obscures the fact that one treatment may be preferable for some children and another treatment for other children.

Such a situation apparently does exist in the field of reading. Comparisons of linguistic and basal approaches suggest there is no one best method. In a cooperative study involving 27 individual projects, Bond and Dykstra (1967) reported no consistent differences between groups. No one approach was successful for all children. Within each treatment some children failed to read, but the characteristics of the failures varied as a function of treatment. The finding is supported by Hurley's (1968) report that learning disabilities or reading failures in Champaign, Illinois, and its sister city Urbana, had different characteristics, presumably because the two school systems had different approaches to the teaching of reading. Theoretically, then, judicious matching of treatment to subject would reduce the number of failures produced by imposition of one method of instruction on all students regardless of individual differences.

The longitudinal study being conducted by the University of Minnesota, then, is not designed to unearth the "best method or philosophy

per se." It is primarily concerned with individual differences and only secondarily with group effects. It is possible that one approach and one method will prove beneficial to all children but the investigation is predicated on Gallagher's (1968) "unthinkable thought" that all methods of teaching the hearing impaired, when applied to all children, are to some extent failures. Hopefully the most fruitful part of the search will unearth indicators of the best match for a particular child at a particular stage of development.

CONCLUSION

On balance, the author, whose world view generally leads him to equate the past with failure, the present with change, and the future with success, looks to the future of education of the hearing impaired with cautious optimism. The advances of recent years in the field have come in medicine, primarily in the near elimination of post-lingual hearing loss in children in the United States, and in technology in the form of improved hearing aids and sophisticated audio-visual hardware. Education, the final component of the triad, alone has failed to make any substantial new contribution in the ongoing struggle against severe hearing impairment. Educators of the hearing impaired, long given to inbreeding, traditionally have been isolated from the main body of education and therefore have not benefitted adequately from improvements in general education.

It is to be expected that advances in medicine and technology will continue. However, there is little reason to believe that elimination of severe hearing losses, in the form of complete breakthroughs in medicine, or the development of hearing aids capable of presenting normal, undistorted speech to even the profoundly deaf child will

preceed man's colonization of Mars. The burden is now on educators to begin to contribute their share. In this context the signs are encouraging. The growing research by scientists on the effects of severe hearing loss on cognitive, linguistic, perceptual, and social functioning has revealed many of the problems attending education of hearing impaired children. Educators of the hearing impaired are now branching out into "pure" disciplines such as psycholinguistics and cognition and into "applied" disciplines such as reading and special learning disabilities.

Although the tiresome oral-manual controversy has taken on different dimensions, other issues exist which could create new lines of division. Educators will have to exercise great care before solidifying positions on questions such as unimodal vs. bimodal presentation and social vs. cognitive preschool programs. For years lip service has been paid to the concept of individual needs and individualization of instruction. If the ideal or the pursuit of the ideal becomes a reality in the near future, such either-or dichotomies will become meaningless and we will actually approach the ideal: fitting the method to the child rather than vice versa.

APPENDIX A

PERIODICALS IN THE UNITED STATES CONCERNED PRIMARILY WITH DEAFNESS

American Annals of the Deaf
5034 Wisconsin Avenue, N. W.
Washington, D. C. 20016

The American Annals of the Deaf is the official organ of The Convention of American Instructors of the Deaf and of The Conference of the Executives of American Schools for the Deaf.

Published six times per year. Subscription price - $10.00 per year.

Deaf American
5125 Radnor Road
Indianapolis, Indiana 46226

The Deaf American is the official organ of The National Association of the Deaf.

Published 11 times per year. Subscription price - $5.00 per year.

Journal of Rehabilitation of the Deaf
7427 Leahy Road
New Carrollton, Maryland 20786

The Journal of Rehabilitation of the Deaf is the official organ of the Professional Rehabiliation Workers with the Adult Deaf.

Published four times per year. Subscription price - $8.00 per year.

Volta Review
1537 - 35th Street, N. W.
Washington, D. C. 20007

The Volta Review is published by the Alexander Graham Bell Association for the Deaf.

Published nine times per year. Subscription price - $12.50 per year.

APPENDIX B

MAJOR ORGANIZATIONS SERVING THE DEAF IN THE UNITED STATES

Alexander Graham Bell Association for the Deaf
Volta Bureau
1537 - 35th Street, N. W.
Washington, D. C. 20007

Conference of Executives of American School for the Deaf
5034 Wisconsin Avenue, N. W.
Washington, D. C. 20016

Convention of American Instructors of the Deaf
5034 Wisconsin Avenue, N. W.
Washington, D. C. 20016

Council of Organizations Serving the Deaf
4201 Connecticut Avenue, N. W.
Suite 210
Washington, D. C. 20008

National Association of the Deaf
905 Bonifant Street
Silver Spring, Maryland 20910

National Fraternal Society of the Deaf
6701 West North Avenue
Oak Park, Illinois 60302

Professional Rehabilitation Workers with the Adult Deaf
Department of Special Education
University of Tennessee
Knoxville, Tennessee 37901

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